REMARKS

Claims 1-3 and 5-19 are pending in the present application, and are rejected. Claim 1 is herein amended. No new matter has been presented.

Rejections under 35 U.S.C. §103(a)

Claims 1-3, 5, 6, 8, 11, 12, 14, 17 and 18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al. (US Patent 5,412,246). The Examiner concludes that it would have been obvious to combine the teachings of Wong and Dobuzinsky et al. in view of because the oxidizing agents such as nitric acid help remove defects (see Wong column 1, lines 20-25).

Claims 7, 9, 13, 15 and 16 are rejected under 35 U.S.C. §103(a) as being patentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al. (US Patent 5,412,246) as applied to claim 3 above, and further in view of Muramatsu et al. (US Patent 6,468,841). The Examiner admits that Wong and Dobuzinsky et al. fail to teach the use of nitric acid (see above). The Examiner concludes that it would have been obvious to combine the teachings of Wong and Dobuzinsky et al. in view of Muramatsu et al. because the oxidizing agents such as nitric acid help remove defects (see Wong column 1 lines 20-25).

Claim 10 is rejected under 35 U.S.C. §103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al. (US Patent 5,412,246). The Examiner concludes that it would have been obvious to make an oxide film greater than one nanometer, because if the dielectric film were less than one nanometer it would lose its dielectric properties.

Claim 19 is rejected under 35 U.S.C. §103(a) as being unpatentable over Wong (US Patent 5,423,944) in view of Dobuzinsky et al. (US Patent 5,412,246). The Examiner asserts that since the Dobuzinsky et al. forms the nitride after the oxide is formed inherently there is a fixed period of time and the nitride is left for a fixed period (otherwise distinct layer of silicon oxide and silicon nitride would not have been formed as shown in figure 59. The Examiner concludes that it would have been obvious to no one of ordinary to combine the teachings of Wong and Dobuzinsky et al. in view of because the oxidizing agents such as nitric acid help remove defects.

Applicants herein amend the claims to more clearly clarify the invention. Thereafter, Applicants respectfully disagree with the rejection because not all of the claimed limitations are taught or suggested by the cited references, alone or in combination.

Claim 1 and all claims dependent therefrom, as herein amended, include the limitations "by performing a processing for the formation of a film of the same material as said first insulation film at low-temperature by plasma processing with a radial line slot antenna through microwave excitation, forming a second insulation film of the same material as said first insulation film so that said second insulation film embraces said first insulation film".

Specifically, the first insulating film is equivalent to the chemical oxide film 14 shown in Fig. 3C, and the second insulating film is equivalent to the tunnel oxide film 15a shown in Fig. 3D.

In the present invention, as described in line 21 of page 10 to line 4 of page 12, the tunnel oxide film 15a embracing the chemical oxide film 14 having a thickness of about 1.0 nm to about 1.5 nm is formed to have a film thickness of about 7 nm by a plasma processor, as shown in Fig. 7, provided with a radial line slot antenna.

Wong does not disclose or suggest performing plasma processing.

Furthermore, Dobuzinsky et al. fails to disclose plasma processing with a radial line slot antenna through microwave excitation, as in claim 1.

In the equipment shown in Fig. 1 of Dobuzinsky et al., plasma can be generated on the wafer 18 as a semiconductor substrate, by power from the RF powered electrode 20. Since the source of power (RF powered electrode 20) positioned near the wafer 18 supplies power and generates plasma, it is difficult to control generation of plasma, or depending on circumstances, the generated plasma has high energy level and causes damage to an insulating film. As a result, it is difficult to form a uniform and dense insulating film.

On the other hand, in the present invention, with using a plasma processor provided with a radial line slot antenna, as shown in Fig. 7, a plasma processing of the semiconductor substrate is performed through microwave excitation by the microwave supply source 1010 positioned away from the process chamber 1005 accommodating a semiconductor substrate.

In the present invention, because plasma is not generated by the source of power positioned near semiconductor substrate supplies, it is possible to stabilize generation of plasma for the semiconductor substrate. This makes it easy to control plasma.

In view of the aforementioned amendments and accompanying remarks, Applicants submit that that the claims, as herein amended, are in condition for allowance. Applicants request such action at an early date.

If the Examiner believes that this application is not now in condition for allowance, the Examiner is requested to contact Applicants' undersigned attorney to arrange for an interview to expedite the disposition of this case.

If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,

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